

SECOND ED



DAME STEPHANIE SHIRLEY
LET IT GO

Let IT Go

Dame Stephanie Shirley

father's absence – as I am sure we must have – we gave it little conscious thought. We had other things on our mind.

I turned 18 in 1951, and was faced straightaway with a big choice: did I want to go to university? After much agonising, I decided against it – a decision I have regretted ever since. With no money coming in from my father, and my mother now training rather than earning, we were so short of funds that it was hard even to find the fee for sitting the scholarship exam, let alone to justify the prospect of still more years without an income. It seemed better to try to start earning money without delay.

But I have never regretted the other big decision I took that year. On 29 January 1951, my mother and I became British citizens. Renate considered joining us but chose not to: she had never really bonded with her adopted country. (Some years later, faced with a choice between naturalising and leaving, she moved to Australia – where she felt so at home that she was naturalised after just six months.) So it was just my mother and I who went to the local police station, paid £9 each, filled in various forms, and swore a solemn oath of allegiance.

We took the opportunity to change our name, as if closing a symbolic door on the past. Instead of Buchthal, we chose Brook, to mark our shared enthusiasm (one of the few things we had in common) for that most English of poets, Rupert Brooke. It seemed less pretentious without the “e”. I also formally adopted my middle name, Stephanie, which I had increasingly been using for some time.

I was conscious that this was a turning-point in my life: a solemn and welcome one. I had been impressed with England and the English way of doing things ever since my arrival in 1939. Now, in formally committing myself to the country, I felt that I was also committing myself to repaying all the generosity that English people had shown me: to living a life that was worthy of their kindness.

I was, in other words, committing myself to making a success of my life as Stephanie Brook, Englishwoman.

5: The Awkward Age

Finding employment was surprisingly easy. Young, numerate people were in demand, as Britain's budding technology industries broadened their ambitions and their markets. Within weeks of leaving school, I had two interviews, both in north-west London, and, shortly afterwards, two job offers. Both involved being a junior research assistant. One was for the General Electric Company (GEC) in Wembley; the other was at the Post Office Research Station in Dollis Hill. GEC paid slightly better, but they said plainly that they had no interest in helping me to pursue further studies – whereas the Post Office research station was interested in my further development and was prepared to arrange my hours to allow further study. So I signed up with the Post Office and, shortly afterwards, enrolled for evening classes in applied mathematics – and, later, physics – at Sir John Cass College in Moorgate (now the Sir John Cass School of Science and Technology).

So began a strange period in my life: a time of development and turmoil in which I didn't really seem to go anywhere and yet in some important sense was metamorphosing into my true adult self. Now that I look back on them, those ostensibly becalmed years – in my late teens and early twenties – seem faintly surreal. Yet they were critical to the shaping of my career. I suspect that such directionless periods form part of most working lives: what determines our future is how we respond to the frustrations.

I began by living with my mother. Shortly after we were naturalised, she had bought a small house in Colindale, also in north-west London, borrowing the money for a deposit from some German émigré friends and taking in lodgers to help pay for it. (One of the lodgers had helped me to get my two job interviews.). She was now working as a teacher and, with her marriage behind her, was reclaiming control of her life. But we constantly rubbed each other up the wrong way, and so, as soon as I could, I began to rent a bedsit of my own, in Cricklewood.

It was an attic room in a tall Victorian house in a wide, tree-lined road called Walm Lane, with a bustling, bossy, very Jewish landlady called Mrs Cohen; five other lodgers; and a shared bathroom. Even by the standards of the day, it was far from luxurious, yet it felt wonderfully independent. I used to leave early, six mornings a week,

to catch the bus to Dollis Hill (Saturday was a half-day) and often wouldn't get home until 10pm, if I had had an evening class, which generally happened three times a week. There was also studying to be done at weekends. So there wasn't much time to worry about my living conditions.

I learnt to look after myself; to cook (after a fashion, in an oven without a thermostat); to make and mend things; and, above all, to be organised. Long-term existence in a bedsit is tolerable when all the surfaces are clear, but the space closes in on you horribly if you let it get cluttered. Luckily, I didn't have many possessions to keep tidy.

My annual salary – £215 – seemed enough for my needs: I had grown used to living carefully. The monthly pay packet (about £14 after tax) included one crisp white £5 note, which I always tried, in vain, not to spend. Most of the money went on rent and travel, and – a stupid habit that I had for some reason decided to acquire – smoking. I was careful: I would walk part of the way to work rather than pay an extra stage of the bus fare. I often ran out of money before payday – and on one occasion I went without food for so long that I passed out. But I wasn't conscious of being poor in the way that we had been in Oswestry – not least because, for the first time in years, I wasn't dependent on anyone else's charity.

Cricklewood seemed a cheerful place, with lots of Jewish and Irish people and a few early Jamaicans. It felt lively but safe – unless you walked down Cricklewood Broadway at pub throwing-out time – and I was glad to live there. Compared with the rural England I had known thus far, north-west London buzzed with cosmopolitan sophistication.

My work at the Post Office was menial. As a research assistant, I was there to perform routine or tiresome tasks for proper researchers. A lot of it was mere arithmetic – drawing graphs, or slogging through repetitive calculations or tables to try out ideas, or banging figures through a comptometer (a kind of electromechanical adding machine that was effectively a primitive calculator) to make statistical inferences or to work out probabilities. The subject matter varied. One day we'd be helping some near-genius with pioneering work on, say, telephony; the next we'd be doing tedious sums connected with the postal service. I remember once having to analyse the number of strands in a piece of string from a ball found in a suspected thief's shed, to see if, statistically, there was a match with the string of a stolen parcel.

It was unexciting but strangely satisfying. You knew exactly what your work was, and whether or not it was done, and whether or not it had been done well (which it had to be). And I, at least, felt that there was some purpose to it.

There were four of us, all in our late teens, all working on similar tasks on the same little block of desks. For about a year we called each other "Miss Brook", "Miss French", "Mr Hodges", and so on. Then, daringly, someone suggested: "When nobody's here, shall we use first names?" So we did. But we never really became good friends: the nature of the work wasn't conducive to casual chat. One of the highest priorities was to have a completely clear desk at the end of each day. Apparently this was for security reasons.

Our immediate boss was very staid, buttoned-up Scotsman called Ettrick Thomson, who shared an office with three other senior people, one of whom was his boss: a bad-tempered, reclusive man called H J Josephs, who had a chip on his shoulder about being self-taught and who dealt with his insecurities by trying to make his junior employees cry. He never quite succeeded with me but came close several times. What saved me was the discovery that, as my evening classes expanded my mathematical education, I was beginning to understand many concepts better than he did – and could make him back off simply by speaking confidently about whatever subject he was picking us up on. Yet for all his unpleasantness he had a passion for his subject – a sense of its beauty – and a genuine yearning for excellence. It was hard not to be inspired by this, and, in a strange way, I think he was a good influence on me.

I also had a more distant boss – Mr Joseph's superior, Doc Jarvis – who was notable for having appalling handwriting, like a doctor's. No one dared go back and ask him what his scrawled memos meant, and so one of my tasks was to decipher them by sheer force of logic. (For example: "This must be a 'D', because he always starts with 'Dear', and so this must be a 'D' too... while that must be another 'e...'"; and so on.) In a sense this was fitting. Deciphering had an honoured place in Dollis Hill's intellectual traditions. Workers at the research station (which had opened in 1933) had built the world's first programmable electronic computer, the Colossus 1, in 1943. This was used, along with nine Colossus 2s built the following year, by the code-breaking team at Bletchley Park that cracked the Nazis' supposedly indecipherable

Enigma code – and it's even more opaque successor, the teleprinter code known as Lorenz or FISH.

There were people still working at Dollis Hill in the early 1950s – Tommy Flowers and Allen “Doc” Coombs were the most senior – who had played a pivotal role in the wartime work of Bletchley Park, which in turn had been crucial to the Allied victory. The Colossus 2, Tommy Flowers's brainchild, provided vital decrypt information on the eve of D-Day, days after its delivery from Dollis Hill to Bletchley Park.

No one spoke about this at the time. People still took the Official Secrets Acts very seriously. (Even Tommy Flowers's family didn't learn about his war work until 1970.) But I think we had a vague sense that this unassuming man had done something important. And, in the meantime, it was clear that his area of expertise – essentially, the development of very early computers into recognisably modern computers through the pioneering use of thermionic valves (tubes) rather than electro-mechanical switches – was close to some of the wildest frontiers of human knowledge.

The current aims were relatively mundane: developing the first electronic telephone exchanges for the Joint Electronic Research Council; or – something I would later be involved in – developing ERNIE, the Electronic Random Number Indicator Equipment used to pick Premium Bond numbers. But there was still an exciting sense of being at the forefront of new technology – especially at those points where our work edged into territory that would nowadays be known as computing.

At some stage, after a year or so of evening classes, it began to dawn on me that, while I loved the beauty of maths, and could master it to a fairly high level – and began to study for a bachelor's degree in mathematics as soon as I had obtained the matriculation requirements – I was never going to become the world's greatest mathematician. This might have been disillusioning had I not more or less simultaneously fallen in love with computers.

It was a good time to do so. On the one hand, some of the most brilliant minds of the day were developing the field. On the other, the technology was still sufficiently basic for a mind like mine – clever but not genius material – to be able to grasp the problems involved, if not to deduce the solutions. The mechanical calculator on which I churned out my boring calculations was so basic that it hardly deserves to be

called a precursor of the modern computer. Yet even I could sense – intuitively – that, with sufficient brainpower, this simple concept could evolve into an unimaginably powerful computing device.

It was a bit like being in at the birth of, say, American democracy. First principles were being laid down and tested, as the twin streams of automated calculation and programming converged to make what had hitherto been a boffins' fantasy – high-powered artificial intelligence – a tantalisingly achievable possibility.

I had no idea how the next breakthroughs would be achieved, but the evolution of technologies to date – punched tape, punched cards, thermionic valves, transistors – was perfectly comprehensible to me, and I sensed, correctly, that when the history of computing came to be written, several of its early chapters would be set in Dollis Hill, in the early 1950s.

All this made my work seem rather less banal than many first jobs. I was growing used to the disciplines of work – doing things in an orderly, reliable way, keeping records, putting personal moods and problems to one side – and I could see the value of doing so. The calculations entrusted to me were growing gradually more challenging. And if I did sometimes balk at remaining an insignificant drone in the great scheme of things, well, I was also young, and there were other things in my life.

I might, however, have been pushed to say honestly what those other things were. Yes, there were my studies, in which I took a keen or arguably excessive interest (partly because they were inherently interesting but also because of a neurotic obsession with doing as well as I possibly could in exams). I enjoyed those early evening journeys across London, eagerly anticipating each evening class (although I never quite adjusted to the fact that some colleges had no women's toilets); and, heading back to Cricklewood later on, I would feel my eyes drooping with satisfied exhaustion.

But even the most serious-minded young woman cannot work all the time, and gradually, as London grew less strange, I became aware of empty spaces in my life. Some were filled simply with loneliness; others by staying in fairly frequent touch with Auntie and Uncle. I also made occasional weekend visits to some friends of my mother's, the Samsons, who had known my parents from Dortmund but had got out with their wealth intact in 1933. They lived in Edgware, and were kind

in a very serious sort of way. Helen Samson was a dentist; I still have the gold fillings she gave me as birthday presents.

The Samsons introduced me to the refugee circles in which they moved, for which I should have been grateful; but I felt stiflingly bored in the company of people who talked only of what they had left behind. I also had a phase – also suggested by the Samsons, I think – of working as a volunteer serving drinks on a charity barge on the Regent's Canal: not from any altruistic motives but as a way of meeting people.

Then, as I developed a sense of myself as an independent adult, I began to feel that I was too grown-up for that sort of thing. The result was that I spent less time with the Samsons and their contacts, without meeting anyone else. Sometimes I went all the way from Saturday lunchtime to Monday morning without speaking to another human being.

At other times the emptiness was filled with a series of rather pointless love affairs with a succession of not very suitable young men – whom I had met, usually, via work or college. I look back today on this period of promiscuity with a combination of embarrassment – all those floorboard-creaking tiptoed departures late at night – and pity for my former self. I suppose it was a fairly predictable response to the lack of human warmth in my life – and a not uncommon way for an insecure young woman to create a sense of identity and self-worth. In a sense, I was discovering who I was. It is interesting, in this context, that on one occasion in this period my father sent me a letter using my old name. “Do you know anyone called Buchthal?” Mrs Cohen asked me when I came home. “No,” I said – and had climbed two flights of stairs before I realised my mistake.

The cumulative effect of these experiences was neither escape nor self-confidence but, instead, increasing misery. I became jumpy and anxiety-prone, and I often felt paralysed with terror on my late-night walks back from the bus-stop. Such fears were not entirely unreasonable, especially in those impenetrable “pea-souper” autumn fogs that still plagued London before the 1956 Clean Air Act. There was almost an assumption, in those days, that an unaccompanied woman who bumped into a man in such conditions would be raped. I dealt with this by learning some basic self-defence skills, which boosted my confidence a little. (It’s always reassuring to know how to knee a man in the groin.) But a broader, less specific anxiety continued to gnaw

away at my life. Everyone else seemed to have roots, whereas I was just an exile, an outsider. The sound of Viennese music would reduce me to tears; but then so, increasingly, would all sorts of things, including the most mundane setbacks in everyday life. I began to fear that I would never be at peace again.

Eventually, I sought medical help. The doctor, a Jewish émigré, prescribed me dexamyl, the notorious amphetamine-based antidepressant better known (especially by US servicemen) as Purple Hearts. At first I would take one only when I felt especially bad; then, whenever I felt I needed help to get through a particularly difficult day; and then to get me through just about any day, in case it was difficult. Eventually I was taking them most evenings as well – just to get me through the night.

These were bleak times – and of course there was no question of sharing my troubles with either my colleagues or my family. At least once I seriously contemplated putting my head in the oven. If the oven hadn’t been so filthy I think I might have gone through with it – but it seemed ridiculous to clean the oven just in order to commit suicide. *

Instead, I finally told a little of what I was going through to one of my ex-lovers, who was perceptive enough to suggest that there was an underlying cause to all this insecurity and all these failed affairs: that I was, in effect, choosing unsuitable partners in order to set myself up for rejection, for reasons that probably lay buried in my past. He also persuaded me, with difficulty, to sign up for some psychoanalysis at the Tavistock Clinic – the pioneering therapeutic unit in Marylebone that had recently begun to specialise in family dynamics. Some people sneer when this kind of thing is mentioned. They are welcome to their cynicism. For me it was a godsend. A few tentative sessions with a Jungian therapist called Dr Ezriel turned into a sustained course of regular analysis lasting six years, in the course of which I became aware of various issues that now seem so obvious to me that I cannot imagine how I ever managed to bury them. For example: I felt rejected by my mother, who had not only sent me away on the Kindertransport but had also chosen to be reunited with Renate in preference to me; I felt rejected by my father, who had not only sent me away but had subsequently abandoned me, along with the rest of his family, a second time; and I felt devalued by the chronic sense, going back to my very earliest memories, that I was displeasing to my mother. The fact that

the Nazis had wanted to kill me hadn't done wonders for my self-esteem either.

I had known all this for years, of course. What I had buried was the pain. My conscious mind had focused on the positive side of my story: how lucky I had been to escape the Nazis, and to be shown such kindness by my foster family and my adoptive country (whose NHS, I noted with grateful amazement, was now providing me with this psychoanalysis). Perhaps as a result, I had never thought clearly about how much certain things had hurt me. I had resented my mother's constant criticisms and disapproved of my father's undutiful conduct towards his family. But I had never focused on what these things had done to me and to the unhealed child within me.

Now that I was finally doing so, I was able to consider my feelings rationally. I could see, on the one hand, that there was nothing to be ashamed of in having been hurt, but also, on the other, that most of these rejections were no reflection on me. I had been sent away because of Hitler's cruelty, not because of my own failings; and if I irritated and disappointed my mother, that was largely because of the failure of her marriage rather than my shortcomings as a child. I still felt pain – of course I did. But I also had a choice, now, between letting this pain control my life and leaving it behind.

I resolved, eventually, to leave it behind.

In the same way, psychoanalysis taught me to look differently at another issue that had been eating away at me: survivor guilt. I don't know if I had ever explicitly formulated the thought that I was undeserving of life, when so many millions of others had had life stolen from them, but now that I looked in on myself I realised that this idea underlay much of my long-term unease. Now I turned a more forgiving light on the issue. Yes, I had been lucky: astonishingly so. But my luck was no more undeserved than it was deserved. It was not my fault. Rather than agonising for ever over the unanswerable question "Why me?", I could choose to make more positive use of my luck. In other words, I should make the most of the life that had been vouchsafed to me – and make each day count, so that my life would have been worth saving.

I mention all this partly because it was a significant stage in my personal evolution but also because it explains why these early years of my career were, in general, uneventful. By the time I had fitted in

my evening classes – my initial studies in advanced mathematics and physics were followed by a four-year degree course at Sir John Cass College and, after that, a further one-year stint working studying computer logic at Birkbeck College – and my therapy – initially three times a week but later just once a week – there was little time left to do much else except work and sleep.

It also gives a hint, I think, of how the shadow of war still lingered over 1950s Britain. Compared with tens of millions of fellow Europeans, I had been all but unscathed; yet even I was still traumatised by the conflict's destructive effects. If people in general were a little numb and withdrawn in the way they worked and lived, it was hardly surprising.

But things could have been worse, and, in my increasingly frequent moments of maturity, I began to develop a sense of contentment. Yet it was all too easy to slip back into a sense of aggrievement and frustration, especially in the early days of my therapy. This was partly because I was beginning to suspect that my progress at work was being hampered by prejudice. My evening classes had raised me from the bottom of Dollis Hill's intellectual food chain – I was now sufficiently qualified to start studying for a bachelor's degree – and I began to look out for a less menial position. A vacancy for an assistant experimental officer (the next grade up) was advertised internally, and I asked Ettrick Thomson to put me up for it. He looked awkward and, without explanation, refused. I felt, initially, crushed. It took me some time before it occurred to me that the most likely explanation for his refusal was my gender.

Undeterred, I found a public version of the advertisement – published in *The New Statesman*, I think – and applied anyway. I was interviewed and, in due course, appointed. Ettrick Thomson never forgave me.

I suppose this must have meant that I was growing more confident – or, at least, behaving in a way that suggested greater confidence. I was scarcely out of my teens, but perhaps my fractured upbringing had given me a sense that, if I wanted to make anything of my life, I needed to take control of it myself. It doesn't surprise me at all, in retrospect, that some people saw me as pushy. A kinder analysis would be to say that, like all refugees, I had been forced to develop a strong sense of independence.

I was certainly independent in my lifestyle, by the standards of the day, setting my own agenda rather than being at someone else's beck and call. I kept in touch with my mother, sporadically, by phone – but hardly at all with my father, whose new wife, Maria, wanted as little to do with his previous family as possible. I exchanged regular and warm letters with Renate, who by now was settled in Sydney (where she in due course became an admired social worker, specialising in the care of traumatised children); but the physical distance between us prevented us from playing major day-to-day roles in one another's lives. I also kept in touch with Auntie and Uncle, and I still paid them occasional visits when time permitted. But I had by now begun to look rather disdainfully – with my young woman's arrogance – upon what I saw as their parochial outlook; and, as the years passed, time permitted less often.

Instead, the main focus of my life outside work became Walm Lane, where I gradually settled into more mature habits and began, for example, to give embryonic dinner parties in my little bedsit. I even organised, towards the end of my third year in London, a small 21st birthday party for myself. This was attended by a number of family friends as well as younger colleagues from work and college. There was also an older man present, called Trevor Attewell, who was at that stage my boyfriend.

This was the most important of my various pre-marital relationships, and the longest-lasting. Trevor was much older than me, and married, and in almost every respect unsuitable. Later, when I had untangled some of my subconscious knots, the attraction was obvious. My father had rejected me; my mother had always been criticising me for being immature (an excusable failing, one might think, in a child). What could be a better way of answering them than to be the loved one of a successful older man?

The affair lasted for several years, on and off, and was sufficiently serious for me to be cited as co-respondent in Trevor's divorce. I'm not sure that I was the cause of it: he had been separated from his wife before he met me, and there were faults on the other side as well. But convention dictated that the man should be the guilty party, and so, according to the sordid custom of the day, we spent a weekend at a hotel in Brighton where, by prior arrangement, the hotelier served

us breakfast in bed, so that he could later testify in court to Trevor's infidelity.

I relate this not because I am proud of any of it but because it must say something about the kind of person I am, and how I became who I am. I also have a vivid memory of how, many months later, the relationship ended. Trevor was divorced by then, and was hoping that we could start a new life together. I remember feeling a mounting sense of panic as this prospect grew more real and realising with increasing certainty that this wasn't what I wanted at all. I liked Trevor, and enjoyed being with him, but the longer we spent together the more I realised that I was still developing while he was not. He was happy with his place in the world, whereas I wanted more. And while he was certainly not stupid, I knew that I was outstripping him intellectually.

I had, I realised, been hiding this fact from both of us, just as I had with my previous lovers. That was what women did in those days. (For years, I had been in the habit of replying, if a man asked me what I did for a living, that I worked for the Post Office – hoping that he would think I sold stamps or something – rather than admitting to working with my brain at the internationally admired Dollis Hill Research Station.) But now, when it came to a decision that would define who I was for the rest of my life, I realised that I could no longer go along with this kind of self-effacement.

I had to stop playing a part, to stop playing down those very qualities that made me who I was – my intellect and my curiosity and my restless drive to have an impact on the world. It was one thing to pretend to be someone else, in order to fall in with a man's understanding of what a girlfriend's role should be and thus to oil the wheels of a relationship in the short term. It was a very different thing to build my whole life on that pretence.

I realised, with shocking clarity, that if I wanted more from life I would have to go out and insist on it – irrespective of any challenges this posed to received notions of "femininity". That meant moving on from the whole idea of living my life as a supporting role in someone else's drama, whether it was Trevor's or anyone else's.

Perhaps I had finally grown up. From now on, I decided, I would be my own person. I would stop apologising for myself, stop hiding myself and, while I was at it, stop feeling sorry for myself. I wanted

whatever talents I had to be fully used, and the only person who was going to make that happen was me.

I also resolved that I would stop congratulating myself on the little I had achieved in my life so far. Resting on one's laurels is the surest route to stagnation. Instead, I would keep aiming higher and higher, giving free rein to my instinct to ask, restlessly, "Is that all there is?" If I failed, so be it; but I would never allow myself to get into a position where I would curse myself for not having tried.

I have not always succeeded in sticking to these resolutions. But, more than half a century later, I am tempted to say that they have defined my life.

6: The Glass Ceiling

By the mid-1950s, I was developing a core of inner confidence that did not meet with universal approval. I had added a bachelor's degree in mathematics to my qualifications. If I hadn't taken my exams in the middle of a pregnancy scare, I might have got a first rather than a 2:1. Even so, I was eligible for further advancement. So I signed up for a year's study for a master's degree, at Birkbeck College, and applied for another promotion.

My immediate boss, Ettrick Thomson, supported this, yet my applications for a Scientific Officer's post came to nothing. Word eventually reached me that men were resigning from the interview board that administered such matters rather than recommend me for promotion – they disapproved on principle of women holding managerial posts. I was devastated by this: it felt like a very personal rejection. Even when I tried to rationalise it, it was impossible to know if it was me or my gender that was the problem.

Comparable problems arose when I began to express my growing interest in computers. One of the perks of working for the Post Office was that you got six weeks' holiday a year. The drawback was that I, at least, could not afford to go anywhere. So I had arranged, though a fellow student at college, to spend some of this time working unpaid at the General Electric Company (GEC) Hirst research centre in Wembley. Bill Cameron, the friend in question, had spoken enthusiastically about a new computer he was working on: the HEC4. "You'd love this," he told me. So I went along for a couple of weeks in the summer of 1954 and made myself useful and, in the process, picked up the basics of this pioneering project. The HEC4 was a huge, multi-part machine that to the modern eye would look more like a fitted kitchen than a personal computer (or PC). While primitive, however, it was none the less unquestionably a computer, in a way that the calculator I had been using was not. It received its initial data and instructions on punched cards (80 columns, and six instructions, per card) and processed them using a 64-track magnetic drum. Ultimately, it could theoretically be used for a wide-range of complicated and repetitive data-processing tasks, from payroll processing to production output analysis. But at this stage the challenge was simply to make it work.



Checking the randomness of the ERNIE premium bond computer was an important part of my postgraduate work at the Post Office Research Station in Dollis Hill.

I spent many weeks watching Bill and his colleagues working on this. (I had to do something with my annual leave entitlement.) My understanding grew. And I became increasingly excited by the thought that this was just the tip of the iceberg. As computers became more reliable electronically, so the possibilities for programming them would be hugely and thrillingly expanded.

Eventually, I went to Ettrick Thomson and said, look, couldn't we use some of these ideas?

The suggestion wasn't well taken.

No doubt such rejections were largely my fault. I wasn't a great communicator and, on the whole, was better at just getting on with my work than at expressing myself. But it was impossible to avoid the suspicion that, had such suggestions come from a man, they might have caused less offence.

Once again, I felt crushed. I was used to sexism (although I didn't yet know that there was a word for it). There were scarcely a dozen female employees in the entire establishment, and walking into the main canteen reminded me of walking into the boys' school in Oswestry: hundreds of heads would turn and gawp at me with expressions that might have indicated a variety of things but almost certainly didn't indicate respect. I had grown used to the need to dress as unprovocatively as possible, in a plain grey suit and white pintucked blouse, like a female version of a man, with a black band round my neck instead of a tie. I had learnt to live with the angry minority of senior scientists who seemed affronted to encounter a girl in the workplace at all and expressed their affront by being as scathing and horrible as possible to their female subordinates. I had even grown used to the fact that women's pay scales were substantially lower than those for men, although I made no secret of my resentment of this injustice. (Sometimes, a man would offer to help me carry my typewriter-like calculating machine – which was exceedingly heavy – only to receive the tetchy reply: "I believe in equal pay, so I'll carry my own machine.")

What shocked me now was the discovery that, the more I became recognised as a serious young woman who was aiming high – whose long-term aspirations went beyond a mere subservient role – the more violently I was resented and the more implacably I was kept in my place.

But although I felt upset by these rebuffs, life went on. The pain passed; before too long, I bounced back. (This has, I think, been another recurring theme in my life.) I applied a few more times for promotion and, eventually, was promoted. I was, however, moved to a different part of the research station in order to sidestep my colleagues' resentment – which meant that I now had the honour of working in Tommy Flowers's division.

Tommy was not just an engineering genius but also, in spite of his diffidence, an inspirational manager, with a gift for getting the best out of everyone who worked for him. One of our main tasks at the time was to develop ERNIE: the Electronic Random Number Indicator Equipment that had been earmarked to select winners for the impending national Premium Bonds scheme (introduced in 1957). The challenge was to ensure that the device – which worked by sampling "white noise" generated by a neon gas discharge tube – was genuinely random. The key (without going into too much detail) was to use two such devices for each number that needed to be generated, subtracting the output from the second from the output from the first, in case one of them went wrong. This meant – we thought – that 32 devices were needed to generate the requisite 16-figure number. Then our youngest lab boy suggested that we could achieve the same result with just 16 devices, pairing the first with the second, the second with the third, the third with the fourth, and so on, instead of having 16 discrete pairs. At a stroke, the cost was halved. The genius of Tommy Flowers – or part of it – was to run his team in a way that allowed such suggestions to be both made and heard. This may have been the most important thing I learnt from him.

There was great public interest in this project, and occasionally groups of visitors would come to watch us at work. The piece of machinery that usually fascinated them most was a futuristic spherical device, on wheels, that we kept in the corner. We could hardly bear to tell them that this was just the vacuum cleaner.

In another version of my life, I might have spent my entire career at Dollis Hill. Whatever its frustrations and limitations, it was a research station – with "Research is the door to tomorrow" carved over its big stone portals – and most of what we were doing was by definition new and challenging. The work that I was able to contribute to was only a few years behind what real mathematical pioneers were exploring, and

as we grew interested in computing for its own sake – rather than as a slightly tiresome means to a mathematical end – I began to feel that I had found my metier.

I spent a year studying for my master's degree and began to do some pure research of my own, into the feasibility of speech recognition by computers. I also became a founder member of the British Computer Society, in 1957. (I've always been a great joiner of societies and public bodies, perhaps because of the refugee's desire to belong. Around this time I also joined the Interplanetary Society and, for some reason, the Homosexual Law Reform Society – I suppose because of my innate sympathy with outsiders.) I don't think I made a significant contribution to the development of speech recognition software, or indeed to any other aspect of pure computer science, but it was exciting simply to be involved in the field. I felt that I was finally beginning to fly – and made a point of not taking my lunches with the same old crowd in the canteen any more (even if this meant bringing in my own sandwich), so that no one could be in any doubt that I was no longer at the bottom of the organisational ladder.

It felt good to be making a difference to the world at last, and there were plenty of important projects to be worked on, from helping to design the first electronic telephone exchange (at Highgate Woods) to investigating likely traffic patterns on the first transatlantic telephone cable. And I was above all learning, finally, how to work effectively. I learnt – mainly by trial and error – how to use information, how to prioritise, how to manage money, how to impose structure, how to manage time; and, not least, how to get on with my colleagues.

A lingering sense of prejudice remained: of a glass ceiling that would always prevent me from developing my talents to the full. But in the short term I had plenty on my plate to challenge me, and in the end it was not sexism that persuaded me to leave. It was something more personal than that.

This "something" had its origins back in my scientific assistant days, when I had at some point found myself needing to know more about waveguides – the physical structures (such as cables) through which electromagnetic waves are conducted. I asked around, and one of my female colleagues – Valerie Copper – took me to see a man called Derek Shirley.

He worked in a small office in another part of the research station and initially made next to no impression on me. He was extremely shy, and on our first meeting scarcely made eye contact with me. But he was friendly and helpful and, although I still haven't entirely mastered the intricacies of waveguide theory, his explanations were sufficiently useful for me to return on several occasions for further guidance. In due course we noticed one another.

This is not a book about Derek, and I will not attempt here to express in words everything he has since become to me. Only he and I can ever fully understand what we have meant to one another. For more than 50 years, we have shared joy and sadness, adventure and routine, anxiety and contentment, and, above all, love. He remains the rock on which my life is built. Back then, however, he was just a good-looking colleague who, despite his shyness, seemed curiously undeterred by the fact that, the first few times he asked me out, I turned him down brusquely.

There were other men on the scene back then – including, initially, Trevor. But eventually, many months after our first meeting, I agreed, half-heartedly, to a date with Derek. We had known each other for the best part of a year by then, but, even so, it felt awkward to be alone together. We ate at the old Swiss Cottage in west London, and talked largely of music, about which Derek was both passionate and knowledgeable. My main impression was still of his shyness, and of the way he fluttered his eyelashes, rather as a woman does.

A week or so later we went out again, to explore another of his passions: the Thames. Derek had spent his favourite wartime days on the river, along with a close-knit group of about half-a-dozen friends known, collectively, as the River Boys. They had all been working for the Ministry of Defence – at Dollis Hill – on the production of crystal oscillators, which were needed for all sorts of vital military signals work. But they could do so only when they had the necessary quartz, which was in short supply. When they had some, they would work around the clock, pausing only for occasional snatches of sleep on the on-site camp beds. When the quartz ran out, they would disappear for a week or two to mess about on the river, until the next consignment made it across the Atlantic from, I think, Brazil. Derek had spent some of the happiest times of his life on these excursions, and so it seemed natural to him to introduce me to the joys of the river.

I turned up for our day out in my most glamorous dress and white high heels, under the impression that we were going to be on a grand pleasure boat. It turned out that our vessel was a dilapidated punt, whose sides barely poked out of the water. After an hour of uncomfortable punting, the heavens opened, and by the time we returned to dry land I was bedraggled and shivering – at which point Derek finally succeeded in impressing me by producing an enormous towel from the tennis bag that he invariably carried around with him. Perhaps, I reasoned, such a well-prepared man was worth getting to know better.

Our courtship was long-drawn-out. I remember many happy days on the river – which was, we discovered, a better place than most for a couple to get a bit of privacy. I remember some surprisingly good-natured get-togethers with my mother – who found Derek annoyingly vague but concluded, grudgingly, that on balance he wasn't as bad as some of the other men I had been involved with. And I remember that for a long time our relationship veered between delightful highs and apparently terminal lows. I had, for some reason, decided to take up knitting, and during the good spells I spent many of my leisure hours knitting him a sweater. Then, during the "off" phases, the knitting would stop – while at particularly low points I would even start unpicking the work that I had already done.

At some point, after several years, the subject of marriage came up. I can't remember exactly how it arose; only that I didn't welcome the idea. In retrospect, this seems strange. It seems obvious to me now that marriage to a man like Derek was the best thing that could possibly have happened to me. It didn't then.

There were, I think, two reasons. One was that he had not been what I was expecting. I had imagined that the love of my life would be slicker and more polished – more obviously sophisticated; more like my father. So it took time to accept that, although he was not a good communicator, Derek was none the less a deep thinker, with a profound intellectual curiosity that matched my own. (He was always making journeys to Hammersmith public library, where you could borrow both books and long-playing records.) What I ultimately realised was that he was, simply, a good man: gentle, solid, dependable, honest, unselfish and upright – more like Uncle than my father, though much cleverer and, indeed, probably cleverer than me. As such, he was



*My mother made me a beautiful wedding dress of cream brocade.
The top tier of the cake went to my sister in Australia.*

a thoroughly suitable choice as a lifetime's partner. But it took time for all this to sink in.

The other problem was that – in the early stages of our courtship – I was still in the process of unravelling the mental knots of my childhood through my visits to the Tavistock Clinic. In some hard-to-define way, I felt that I was not fit to marry. Marriage was for normal, happy people – whereas I, I had decided, was too damaged; too much of a victim; too eaten up by resentment; too traumatised by exile.

So the idea of marriage was put to one side, and we carried on, knitting, unpicking and reknitting our relationship without really going anywhere. We saw little of each other at work – we were at opposite ends of the site – and lots of each other outside work. The obstacles preventing us from going further seemed as baffling and elusive as the obstacles that prevented my career from going any further.

Then, in the late summer of 1959, my mother went on a trip to Vienna. At the last minute, I decided to join her. We made the grim train journey across Europe, weighed down with baggage and expectation, before finally emerging in the glorious historic city from which we had escaped 20 years earlier. I looked around at its gracious avenues, ancient walls, grand palaces and elegant squares. And I realised in an instant that, lovely as it all was, it meant absolutely nothing to me. It may look strange in print, but at that moment I felt the weight of my past vanish from my shoulders. It was not that I ceased to be conscious of the traumas of my childhood. It was just that the psychological "ghosts" that had been haunting me suddenly seemed small and manageable – scarcely more than a figment of my imagination. I could not deny my past, or make it go away. But, if I chose to be, I could from now on be as unscarred and "normal" as any other English child of the war years.

I telephoned Derek there and then – no easy matter in those days – and told him that I was ready to marry him. We married six weeks later.

The ceremony took place at Willesden Registry Office, on 14 November 1959. Derek had initially wanted a church wedding, but I felt that, for a non-believer like me, that would be hypocritical. (A few years earlier, my urge to belong had prompted me to enrol for Confirmation classes in the Church of England, but by the end of the course I had realised that I lacked the faith to go through with it.) So

instead we booked the last registry office session of a Saturday morning, so that it would feel a bit less like being on a conveyor belt, and then held a small party – for about 40 people – at a hotel in Hampstead. Most of the guests were colleagues, although my mother was there, and Auntie and Uncle, and my aunt Ilse (who had come over from Munich and was shocked by the London smog), but not my father – who had sent a very small cheque which we spent on a very small clock. Derek's parents were there, but many of his family stayed away, disapproving of his marrying a German. Uncle gave me away.

We spent a very short honeymoon in a very grand hotel in Egham, Surrey (chosen because the hotel, Great Fosters, had a four-poster bed). The brevity was linked to the grandness: we ran out of money.

Then we began a new life.

In many respects it was much the same as our old life. For the first eight months, we lived in that same tiny bedsit in Walm Lane – an experience I'd recommend for any newly married couple, because it forces you (eventually) to get on. We wanted to buy a place of our own, but each time we saved up what we thought was enough for a deposit we found that house prices had gone up.

But there was one significant change: I stopped working at the Post Office. It wasn't absolutely obligatory to do so, but the general assumption in those days was that if two people working in the same organisation married, one of them – usually the woman – would leave. (In fact, there was a couple at the Post Office who had broken that convention – and their example alone was enough to turn me against the idea. If they ate lunch together in the canteen, people would gossip about how they were more interested in their marriage than in being good colleagues; if they didn't, people would gossip about how they must have had a row. The thought of my marriage being subjected to such daily public scrutiny horrified me.)

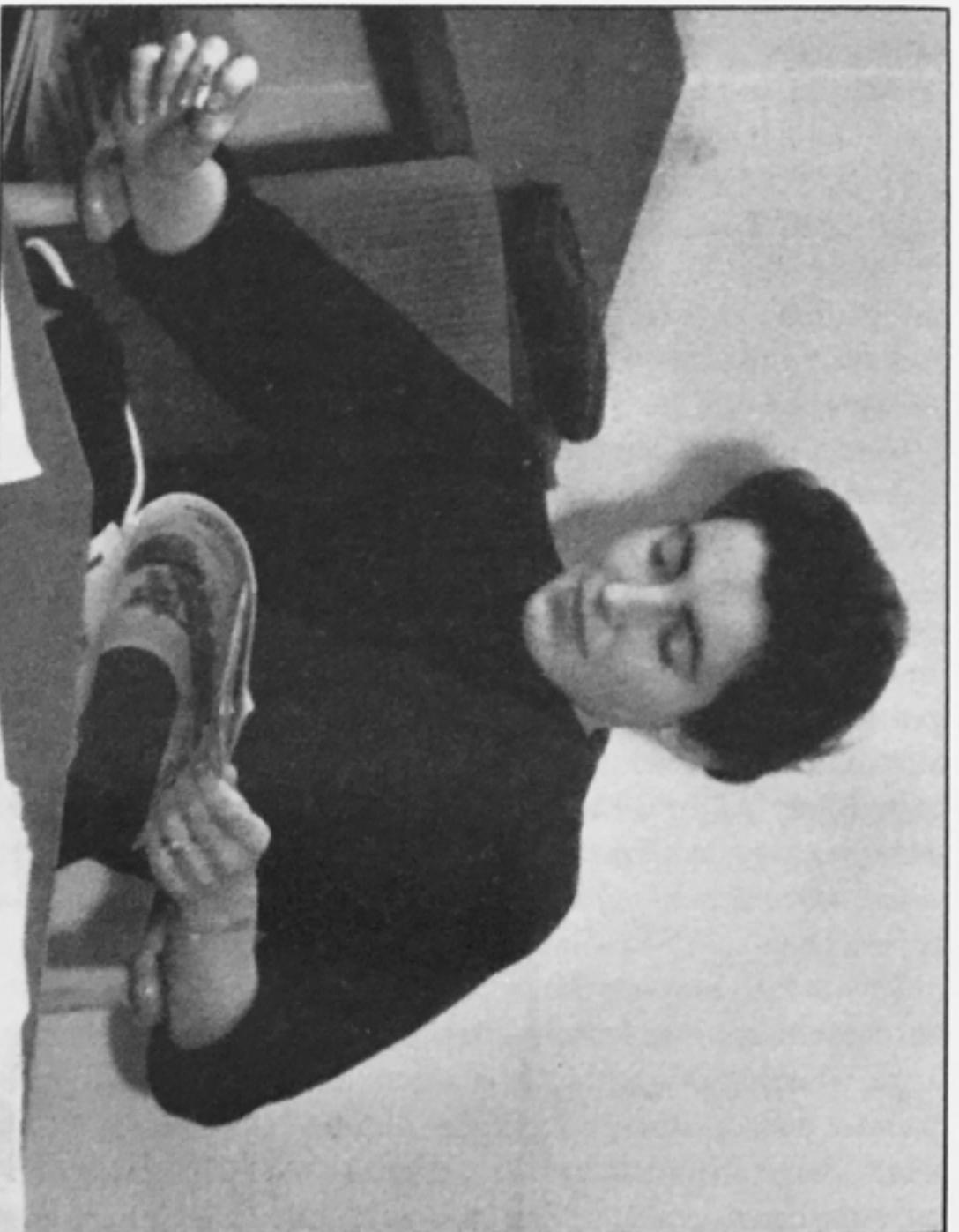
There was no particular reason why it should have been I rather than Derek who left. He was an Experimental Officer, whereas I was by now a Scientific Officer, which made us roughly equal in status. But given the frustrations I had encountered each time I attempted to progress up the Post Office hierarchy, it made sense for me to try somewhere new.

So: I handed in my resignation, cashed in the small pension I had accumulated (which paid for the wedding and the honeymoon)

and looked for something else. Before long, I found another job, at a company called Computer Developments Limited (CDL) in Kenton, near Harrow. This was a subsidiary of International Computers and Tabulators (ICT, which was later absorbed by International Computers Limited – ICL – and, later still, by Fujitsu) and of GEC. It was run by John Wensley, who had been Bill Cameron's boss at GEC Hirst. It was, in those days, a small, young, energetic outfit that was really quite exciting to work for. There were about 35 employees, most of them young and bright, and compared with the Post Office their way of working was thrillingly informal. Everyone used to take their breaks together in the canteen, and staff from different departments would exchange ideas freely. People worked with urgency and enthusiasm, and the long days were shaped by objectives rather than routine. This was, I suppose, my first experience of the difference between the staid public sector and the dynamic private sector.

I was part of the company's software group, which provided software for Computer Developments' computers. My particular responsibility – and that of the handful of group members who worked under me – was for software-testing a new computer, called the 1301, that the company was designing and building in Coventry. Essentially, the object of the software was to check that the hardware (which had unbuffered peripherals, for those of you who understand such terminology) was working properly. This didn't involve making radical new conceptual breakthroughs, but for a mathematician with limited technical experience it was quite exciting.

We worked hard – I have many grim memories of snatching a few hours' sleep in cheap Coventry hotel rooms after working half the night on the computer because other people were using it by day – but I felt that I was learning things. I loved those early computers – huge, whirring things that filled an entire room, and I loved the pure, abstract beauty (not unlike musical beauty) of the logic that underlay their design. The process of designing the 1301 had, it was said, included making a huge "logic diagram" of its workings on the floor of CDL's 50ft-by-15ft meeting-room. Volunteers representing electrical pulses were recruited to walk between the various "gates" (jargon for the electronic devices that compute the value of two-valued signals), just as was supposed to happen in the machine itself. If someone tried to go through a gate that wasn't open, or if two people ended up



Newly married and saving for our first home, I could scarce believe that I should be paid so well in industry. It was a happy period – but I still smoked.

trying to stand on the same point at the same time, then there was a problem that needed to be addressed. It was, in short, a triumph of pure reason, and a labour of many people's love. I used to sit down at the controls to begin a session with the same kind of thrill that one might feel on taking the controls of a shiny new racing-car. I also liked my colleagues, several of whom turned into friends. And, as an extra bonus, I was earning much more than I had at Dollis Hill.

We tried to live just on Derek's salary, putting mine towards buying furniture and saving for that elusive first home. But house prices still grew faster than our savings, and bit by bit we moved our sights away from central London. By the time we found somewhere we could afford, we had reached Chesham, a market town in Buckinghamshire, in the heart of the Chiltern Hills. More precisely, we had reached a hamlet called Ley Hill, a few miles outside Chesham, where we bought a dilapidated brick-and-flint cottage – then being rented by a friendly young couple with a baby – on the edge of some woods. It cost us £4,765 and was called Moss Cottage.

Life here required considerable adjustments. Not only were there holes in the floorboards and leaking pipes to be fixed (by Derek, with admirable patience but limited competence), but we soon realised that we were possibly the only urban incomers in a very rural and isolated settlement. The locals weren't unfriendly, but it was clear that they regarded us with a faintly contemptuous bemusement which it took time to wear down. It didn't help when we held a small house-warming party for a few of our London friends, only for our chimney to catch fire. By the time the conflagration had been extinguished, our reputation as inept townies was firmly set. This had its advantages: I remember one neighbour volunteering (in vain) to put down some unwanted kittens with her bare hands, while another, a frail and harmless old lady, helped deal with a rat in our garden by beating it to death with a stick. Conversely, when some gypsies settled on the edge of Ley Hill for a few summer weeks, ours was the only household that would give them drinking-water. This made us unpopular with some villagers, but with my background there was no question of compromise. I said: "I'm not refusing drinking-water to anyone." In an odd sort of way, we seemed to be more respected after this.

Our lifestyle was basic. Our furniture consisted initially of a bed, two deckchairs, a stool and – for Derek – a baby grand piano. But our

lives were full enough for any discomforts to seem unimportant. We both commuted to work, although not together. I worked longer hours than Derek, and generally got a lift from a colleague who lived nearby. In the evenings, we were quite content with one another's company. Sometimes, though, I would linger in the garden on my return, to listen to Derek playing the piano. He played beautifully, but was still too shy to play in front of me.

This was a happy time: the kind of innocent, peaceful post-war idyll to which many middle-class couples then aspired. But, inevitably, there came a time – perhaps two years into our marriage – when we (or at least I) began to wonder what happened next.

It wasn't that there was anything wrong with our relationship; it was more a feeling that, somehow, I was once again limiting myself in order to fit in with other people's preconceptions. Working wives were rare and often viewed with suspicion, not least in rural Buckinghamshire, and so I had got into the habit of playing down the career aspect of my life, reducing my employment at Computer Developments to four days a week so that my earnings would not outstrip Derek's and ostentatiously spending the remaining day on chores such as laundry, so that his traditional male role as head of the household should not be threatened. (He had, to be fair, never expressed any insecurities on such matters, but I didn't want to take any chances.)

At work, meanwhile, that same sense of arbitrary limits that had frustrated me at the Post Office was beginning to frustrate me at Computer Developments Limited. I had done well as a programmer: one short piece of code I wrote – a "bootstrap" programme that allowed the computer to pull in more complicated programmes – earned CDL hundreds of thousands of pounds. As my confidence grew, however, I found myself increasingly interested not just in software development but also in the marketing side of our operations. It fascinated me to think: "If a computer can do x, what use could somebody make of that function? And how could our company exploit that?" Strictly speaking, however, this was not what I was employed for, and it soon became clear that there were people in the company who did not welcome intrusions on their territory. Perhaps my gender had something to do with it, but the real problem was a more broadly territorial mind-set. I had my place, and I should stay in it.

The turning-point was a meeting at which I was supposed to be talking about the technical aspects of some project. The discussion came round to something more marketing-related – about pricing, I think – and I began to make a suggestion. One of the senior men cut me short: "That's nothing to do with you. You're technical." And that was the end of my contribution.

It sounds a small thing, but the more I thought about it, the bigger it became. It wasn't just the fact that he had said it. It was the fact that I didn't know how to deal with it, and that no one else had piped up to say "Hang on, let's just hear what she's got to say." Women everywhere, in all walks of business, will have had similar experiences. It wasn't, in this instance, a gender thing; but the sense of dumb frustration was the same. How could they know that what I had to say wasn't worth listening to, if they wouldn't even let me say it?

I brooded on this for the rest of the day, and on my journey home, and for much of the evening. Finally, after talking things through with Derek, I reached a conclusion: it was time to move on.

It wasn't just that I didn't want to work there anymore. There was something else.

I had had an idea.